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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,849

07/20/2006

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EXAMINER

LOUIE, WAI SING

ART UNIT

PAPER NUMBER

2814

MAIL DATE

DELIVERY MODE

12/04/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,849	Applicant(s) MIKI ET AL.	
	Examiner Wai-Sing Louie	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 01 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chien et al. (US Pub. 2005/0026399) in view of Lee (US Pub. 2004/0099858).

With regard to claims 1-2, Chien et al. disclose a light-emitting diode (¶ [0013] and fig. 1) comprising:

- A substrate 101, and an n-type layer 1030, an multiple quantum well (MQW) active layer 1032, and a p-type layer 1036 formed on the substrate 101, the active layer 1032 being sandwiched by the n-type layer 1030 and the p-type layer 1036 (¶ [0014] and fig. 1);
- Chien et al. do not disclose the active layer 1032 comprising a thick portion and a thin portion, where the active layer 1032 has a flat lower surface and an uneven upper surface so as to form the thick portion and the thin portion. However, Lee discloses the MQW active layer 34 comprises an InGaN quantum dot well layer 34d1 and an AlGaIn barrier layer 34e1 (Lee ¶ [0057] and fig. 9), where the quantum dot well layer 34d1 has a flat bottom surface and a thick portion and a thin portion top

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surface (fig. 9). Lee teaches the quantum dot active layer 34 could be used to adjust the energy level and the device serves as an optical amplifier (Lee ¶ [0052]). Therefore, it would have been obvious to one of ordinary skill in the art to modify Chien's device with the teaching of Lee to provide a quantum dot well layer 34d1 has a flat bottom surface and a thick portion and a thin portion top surface in order to adjust the energy level and the device serves as an optical amplifier. Lee discloses the thick portion (quantum dots) is disposed irregularly (see Lee fig. 9, where the quantum dots are irregular).

With regard to claim 3, Chien et al. disclose the top surface of the active layer 1032 is covered with a thin layer of AlGaIn 1034 (¶ 0014).

With regard to claim 4-13, Chien et al. modified by Lee do not disclose:

- The thick portion (quantum dots) is 15 to 50 Å;
- Has an arithmetic mean width of 10 nm or more to 100 nm or less;
- The thick portion has a width of 100 nm or more;
- The thin portion has a thickness of 15 Å or less;
- The thin portion has width of 50 nm or less;
- The difference between the thick and thin portions falls within a range of 10 to 30 Å.

However, Lee discloses the size of the quantum dots can be adjusted (Lee ¶ [0054] and fig. 9). Thus, it would have been obvious to one of ordinary skill in the art to use any suitable thicknesses for the device, because it has been held that

where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Alner*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

With regard to claims 14-16, Chien et al. modified by Lee disclose the MQW has 3 times repeatedly stacked (Lee fig. 9).

With regard to claims 17-18, Chien et al. modified by Lee disclose the barrier layer is AlGa_N and the active layer is InGa_N (¶ [0016] and Lee [0053]), where the mole fraction *x* is 0 to 1 (Lee ¶ [0057]) barrier layer could be Ga_N.

With regard to claims 19-20, Chien et al. modified by Lee do not disclose the barrier layer has a thickness of 70 to 500 Å. Since the applicant has not established the criticality of the thickness stated and since these thicknesses are in common use in similar devices in the art, it would have been obvious to one of ordinary skill in the art to use these values in the device. Where patentability is said to be based upon particular chosen dimension or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

With regard to claim 21, Chien et al. disclose the device has a n-electrode 109 provided on the n-type layer 1030 and a p-electrode 108 provided on the p-type layer 107 (fig. 1).

With regard to claim 22, Chien et al. disclose a flip-chip structure (fig. 1).

With respect to “has a flip-chip-type device structure” of the claimed invention does not result in a structural difference between the claimed invention and the prior art, thus claimed invention is only an art recognized

suitability for an intended purpose, MPEP 2144.07 or it does not carry weight because the limitations are either function or intended use that do not limit the claim to a particular structure, MPEP 2111.04; thus structure of Narayan is capable of performing the same function.

Regarding claim 23, Chien et al. disclose the positive electrode is Au alloy, which is reflective (¶ [0016]).

Response to Arguments

Applicant's arguments filed 8/1/08 have been fully considered but they are not persuasive.

- Applicant argues that Lee does not teach or suggest the claimed limitation, “the active layer comprising a thick portion and a thin portion, the thick portion being disposed irregularly therein” (page 9 of remarks). However, Lee discloses the active layer 34 includes quantum dot layer 34d1 to 34d3 (Lee ¶ [0054] and fig. 9). In fig. 9 shows the quantum dots have different sizes on the same layer and this is irregularly disposed. The images, in fig. 1 and 2 of current application, is so rough and unclear. Examiner can not distinguish the thick portions and thin portions. Therefore, Lee meets the claimed limitation. It is recommended that applicant amends claim 1 to show a distinction from Lee.
- Applicant argues that the combination of Chien and Lee is not proper (bottom of page 9 of the remarks). However, Chien et al. disclose all

limitations in claim 1 except the different thickness portions in the active layer. Lee discloses the active layer has different thickness (Lee fig. 9) and Lee provides a motivation to combine, which is using the quantum dots to adjust the energy level within the active layer (Lee ¶ [0052]). Thus, the combination of Chien and Lee is proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is 571-272-1709. The examiner can normally be reached on 7:30 to 5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free)? If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wai-Sing Louie/
Primary Examiner, Art Unit 2814

Wsl
December 3, 2008.